INPUT® Research Bulletins

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✓ IN BOOK

Systems Management Program—Europe (SMPE)
Executive Research Bulletins

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III.	1.	Growth in Imaging Systems Integration Stimulated by Moves to Case Handling and Office Automation

October 1990
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Route to:

INPUT® Research Bulletin

A Publication from INPUT's Systems Management Programme Europe

Systems Integration

One of the key driving forces in the systems integration market is the need for the client base to change systems in line with changing organisations. Currently, European business is undergoing unprecedented structural change. In the first quarter of 1990, 269 French companies with an approximate value of $10 billion (U.S. dollars), and 370 companies in the U.K. with an approximate value of $9.7 billion (U.S. dollars) were taken over. French companies spent nearly $5 billion (U.S. dollars) to acquire 116 foreign concerns. France has now surpassed the U.K. in merger and acquisition activity, whose significance to software and services vendors is that all over Europe, users are facing a major restructuring, reorganisation, and re-evaluation of their systems.

Systems integration provides the ability to create a solution that integrates disparate environments. It has three key aspects—distinguishing it from other systems solution delivery modes—that make it an ideal response to the systems problems this restructuring creates:

- The multivendor nature of systems integration enables the appropriate technical skills to be applied to the systems. Typically, systems integration projects are complex, involving more that one technology.
- Systems integration is a custom solution that is integrated into the end-user environment.
- Systems integration vendors take management responsibility for the delivery of the system, usually at a fixed price with penalties for project overruns.

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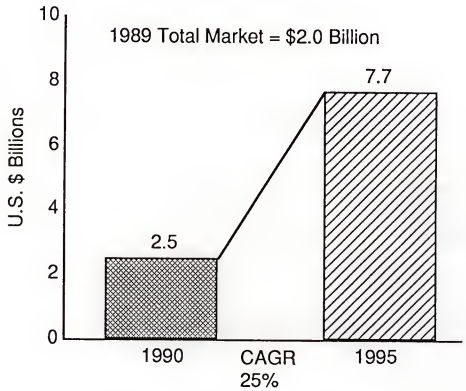
Exhibit 1

Western European Systems Integration Market 1990-1995



The projected growth for the systems integration market is shown in Exhibit 1.

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Exhibit 2

System Integration Forecast
Europe, 1990

Sub-Sector	1989	1990	1991	90-95 CAGR %	1995
Equipment	810	1,000	1,235	21	2,625
Professional Services	980	1,265	1,615	28	4,375
Software Products	125	155	195	26	490
Other Services	60	70	85	18	160
Total	1,975	2,490	3,130	25	7,650

Traditionally, systems development has been managed in-house, with the outside supplier providing only specific services and products. However, many in-house information systems departments are unable to keep pace with fast-changing technology, or to respond swiftly to the need for major systems changes. The appropriateness of systems integration as a response to these end-user needs is accentuated therefore by greater client willingness to contract more management responsibility to their suppliers. This is reflected in Exhibit 2, which shows the projected growth for each subsector of the systems integration market.

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Exhibit 3

Comparative Regional Market Sizes—Europe, 1990 Systems Integration

Region	1990 U.S. $ Millions	Market Share %
United Kingdom	629	25.3
Germany	608	24.4
France	559	22.5
Italy	234	9.4
Benelux	187	7.5
Scandinavia & Finland	113	4.5
Switzerland & Austria	75	3.0
Spain	71	2.8
Others	15	0.6
Total (rounded)	2,490	100.0

Nearly three-quarters of the Western European market for systems integration is composed of the three major country markets of France, Germany, and the United Kingdom. Exhibit 3 shows the relative sizes of the regional markets within Western Europe.

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Exhibit 4

Systems Integration Forecast—Europe, 1990
Local Currency

Country	Currency	1989	1990	1991	90-95 CAGR%	1995
Austria	Sch. M.	255	320	405	25	960
Belgium	BF. M.	2,550	3,170	3,960	23	8,800
Denmark	DK. M.	170	210	260	22	555
Finland	FM. M.	50	60	80	26	190
France	FF. M.	2,700	3,450	4,400	27	11,300
Germany	DM. M.	880	1,100	1,400	26	3,495
Italy	Lra. B.	240	310	400	27	1,020
Netherlands	DFl. M.	170	210	265	24	605
Norway	NK. M.	130	160	200	20	390
Spain	Ptas. M.	6,500	8,200	10,400	26	26,000
Sweden	SEK. M.	225	285	355	26	905
Switzerland	SF. M.	65	80	100	27	260
U.K.	£. M.	320	395	485	23	1,115
Rest of Europe	U.S.$ M.	10	15	20	27	50
Europe	U.S.$ M.	1,980	2,490	3,130	25	7,650

The forces of change are evident in all the country markets of Europe. Besides switching expenditure from internal resources to external resources, systems integration solutions will impact parts of the industry that have traditionally delivered systems solutions differently, such as processing services and standard turnkey systems. The forecasts for each of the country markets are presented in Exhibit 4 in local currency.

The leading vendor of systems integration in Western Europe is IBM; IBM specifically organised to address the systems integration opportunity in Western Europe as early as 1986. The size of their customer base and their capability to respond multinationally to large companies has resulted in their becoming the market leader in this rapidly developing sector.

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Exhibit 5

Western Europe Vendor Revenues Systems Integration, 1989

Rank	Company Name	Revenues $ Millions	Market Share %
1	IBM	205	10.3
2	Cap Gemini Sogeti	190	9.5
3	Andersen Consulting	165	8.3
4	Siemens	90	4.5
5=	SD-Scicon	75	3.8
5=	Sema	75	3.8
7=	Logica	70	3.5
9=	Unisys	70	3.5
9=	Bull	45	2.2
	Olivetti	45	2.2
	Others	970	48.5
	Total	2,000	100.0

Cap Gemini Sogeti have been expanding very aggressively, and have also built an extensive multinational represenation, with the acquisition of Hoskyns in the U.K. being the most recent example. Their acquisition of SCS in Germany puts them hypothetically in the number one position, based upon 1989 revenues, and pushes SD-Scicon out of the top-ten ranking shown in Exhibit 5. Similarly, based on 1989 revenue, the Sema acquisition of ADV/Orga in Germany, which also happened in 1990, would place them clearly in the fifth position.

This Research Bulletin is an excerpt from a full research report issued as part of INPUT's System Management Programme—Europe. If you have questions or comments on this bulletin or wish to purchase the report, please contact Peter Lines at INPUT, Piccadilly House, 33/37 Regent Street, London SW1Y 4NF, England. Tel. (071) 493 9335, Fax (071) 629 0179

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Route to:

INPUT Research Bulletin

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A Publication from INPUT's Systems Management Programme Europe

Market Forces in Systems Operations

Over the last couple of years there has been increased vendor activity in the provision of systems operations services in most of the country markets in Western Europe. In addition to established systems operations vendors and processing services companies, leading equipment vendors such as IBM and Digital Equipment have also entered the market. This is being done either directly, or via joint ventures such as Axone, the Sema and IBM joint venture in France. Andersen Consulting are bidding and winning contracts in the U.K., and Price Waterhouse may also enter the market. BIS Nynex have recently acquired Perthcrest, a U.K. local government facilities management specialist, and Cap Gemini Sogeti have acquired Hoskyns, the U.K. market leader.

In the U.K. publication *The Computer Users Year-book*, there were 46 companies listed as suppliers of facilities management in 1988; in 1990 there are 80 suppliers listed. Similarly, in France, facilities management was never mentioned in trade annuals a few years ago, and now there are at least 90 companies in France offering facilities management or "gerance de centre".

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Exhibit 1

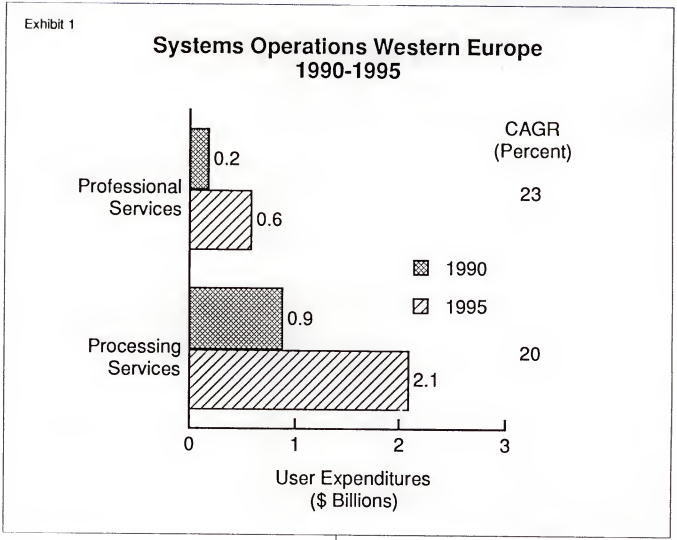

Exhibit 1 shows the market size estimated for systems operations in Western Europe and the growth forecast for the next five years.

France and the United Kingdom are the two largest country markets in Europe, and between them they account for over 56% of the total market. Despite its importance in terms of overall software and services, the systems operations market in Germany is relatively small. Germany, is recognised as a difficult market—requiring very long sales lead times—where a few vendors have been implementing systems operations contracts with little or no publicity or competition. However, more vendors are starting to emerge in Germany, such as IBM, Digital Equipment and Daimler-Benz.

In Scandinavia, the closed user group processing centre is still a common service delivery mode, although such activity is not included by INPUT in its overall assessent of market size. However, there could be increased growth of the systems operations market as the closed user groups experience greater cost pressures, and as their users experience increasing competitive pressure from the deregulation of markets. The same pressures may also impact Germany, where many savings banks share processing centres.

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Exhibit 2

Comparative Regional Market Sizes—Europe, 1990

Region	U.S. $ Millions	Market Share (Percent)
United Kingdom	300	28
France	297	28
Italy	150	14
Scandinavia & Finland	87	8
Benelux	87	8
Germany	75	7
Spain	29	3
Switzerland & Austria	25	2
Rest of Europe	7	1
Total Europe (rounded)	1,060	100

The relative regional market sizes are listed in Exhibit 2.

Besides evidence of a strong push by systems operations vendors in the market, there is also clear evidence of increasing demand for systems operations services. The four biggest, most well-established international systems operations vendors have all affirmed to INPUT that they are experiencing a strong increase in demand for systems operation services. This demand is particularly strong in the government sector in the United Kingdom, where six out of the fourteen regional health authorities have systems operations contracts.

It is not only the level of costs, but the control of costs that can be the significant advantage of a systems operations contract. Some companies run their in-house information systems departments as cost centres, or even profit centres, but there are significant difficulties in creating the costed service concept internally. Some systems operations vendors therefore pay much attention to this aspect of the service, and supply the client with a set of tools that provides them with a greater sense of control of their computer operations.

Market assessments have to be made very carefully for the following reasons. For vendors, it is important to present a proven track record in order to win systems operations contracts; therefore, there is a tendency among vendors to include other revenues, such as those for processing services and professional services, and count them with revenues for systems operations.

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Exhibit 3

France Vendor Revenues Systems Operations, 1989

Rank	Company Name	Revenues FF. Millions	Market Share (Percent)
1.	GSI	250	16.1
2.	EDS	130	8.4
3.	GFI	125	8.1
4.	CISI	100	6.5
5.	Telesystemes	90	5.8
6.	Dataid	70	4.5
7.	SITB-Ageris	55	3.5
8.	Sodinforg	45	2.9
9.	Concept	45	2.9
10.	Axone	30	1.9
	Others	610	39.4
	Total	1,550	100.0

The top ten systems operations vendors in France are listed in Exhibit 3. In France, GSI are the clear market leaders. Telesysteme have the second highest systems operations revenues in France, but a significant proportion of them are captive, placing them fifth overall behind EDS, GFI and Cisi. There are no leading vendors with a significant presence in all the European country markets.

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Exhibit 4

United Kingdom Vendor Revenues Systems Operations, 1989

Rank	Company Name	Revenues £. Millions	Market Share (Percent)
1.	Hoskyns	38	25.3
2.	EDS	15	10.0
3.	AT&T Istel	14	9.3
4.	Datasolve	12	8.0
5.	Sema	7	4.7
6.	SD-Scicon	6	4.0
7.	CMG	5	3.3
8.	Andersen	4	2.7
9.	ITNet	2	1.3
10.	CFM	2	1.3
	Others	45	30.0
	Total	150	100.0

The leading vendors in the United Kingdom are listed in Exhibit 4. Hoskyns have a significant lead in market share over their competitors, but do not figure in any other European countries, having recently withdrawn from the Dutch market. Systems operations accounts for nearly half of Hoskyn's total revenues, and their recent acquisition by Cap Gemini Sogeti will provide an opportunity for leveraging Hoskyns' expertise in other countries in Europe.

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Exhibit 5

Systems Operations Forecast—Europe, 1990-1995
Local Currency

Country	Currency	1989	1990	1991	90-95 CAGR (Percent)	1995
Austria	Sch. M.	90	105	120	15	215
Belgium	BF. M.	1,030	1,195	1,405	18	2,775
Denmark	DK. M.	75	90	105	16	190
Finland	FM. M.	95	115	130	19	270
France	FF. M.	1,550	1,830	2,180	19	4,400
Germany	DM. M.	120	135	155	18	305
Italy	Lira. B.	170	200	245	22	535
Netherlands	DFl. M.	95	115	135	20	280
Norway	NK. M.	70	85	100	16	175
Spain	Ptas. M.	2,900	3,400	3,980	16	7,240
Sweden	SEK. M.	198	230	260	16	485
Switzerland	SF. M.	20	25	35	21	65
U.K.	£. M.	150	190	235	23	525
Rest of Europe	U.S.$ M.	5	5	10	32	20
Europe	U.S.$ M.	880	1,055	1,275	20	2,655

INPUT's forecast for the individual country systems operations markets in Europe is shown in Exhibit 5. The compound annual growth rate over the next five years varies between 15 and 20 percent in the different markets, with an overall European growth rate of 20%.

This Research Bulletin is an excerpt from a full research report issued as part of INPUT's Market Analysis Programme—Europe. If you have questions or comments on this bulletin or wish to purchase the report, please contact Peter Lines at INPUT, Piccadilly House, 33/37 Regent Street, London SW1Y 4NF, England. Tel. (071) 493 9335, Fax (071) 629 0179

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Route to:

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Client Vendor Relationship— The Key to Successful Systems Integration

Systems integration projects are large and complex and therefore carry high levels of risk. While the vendor is the principal adviser to the client, the client must take overall responsibility for the project and become actively involved in its management. Some users experience difficulty in becoming sufficiently involved and taking appropriate levels of project management responsibility. The key to successful implementation is the sharing of project management responsibility between client and vendor.

The key area that needs to be managed by the client is the initial system specification. As well as ensuring that it meets the client's business needs, it is vital that the client, rather than the vendor, decide on the trade-off between cost and functionality. The specification must be both detailed and realistic while avoiding over-elaboration.

Strong management by the user is also essential to ensure that:

- The client takes ownership of the system
- The quality of the development is regularly reviewed
- Cost and timescale milestones are established and closely monitored
- Technology transfer takes place

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Exhibit 1

Western European Systems Integration Vendor Selection Criteria

Nature of Proiect	Key Factors
Systems Integration	Board-level decision Spin-offs from audits/studies Vendor judged on strategic capabilities Limited evaluation of implementation skills
Professional Services	Experience of vendor Detailed evaluation of capabilities Location

Exhibit 1 contrasts the differences in user purchasing style between professional services and systems integration projects. While information systems departments are the primary buying influence for professional services projects, much systems integration activity bypasses the in-house information systems department.

Many commercial systems integration projects arise as a direct result of a top management decision. For example, the business might be changing its focus, or the company might employ consultants to review the capability of the company's existing information systems to support its business aims.

As such, the most important factors in the choice of vendor will be the vendor's ability to understand the business and the issues it is likely to face in the future, from the perspective of top management. Comparatively little attention may be paid to evaluating the development capabilities of the vendor.

On the other hand, a typical information systems department seeking a vendor to carry out specific software development work will evaluate each potential vendor's capabilities in some detail. The information systems department will typically know of the capabilities of many of the major professional services vendors, and will have had experience using their services previously. Vendors not used previously will frequently be given a small project initially to test their capabilities. For each new project, the information systems department is likely to interview the vendor's proposed project manager in some depth, request the CVs of all personnel involved in the project, and possibly seek references from the vendor's client base. The location of the vendor can also be an important factor, since vendor and client personnel need to work closely together, which is aided by physical proximity.

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Exhibit 2

Western European Systems Integration
Why Projects Fail—User Perceptions

- Inadequate user involvement
- User unable to manage vendor
- Specification unclear
- Vendor "knows best"

Exhibit 2 lists some of the major factors that contribute to the failure of systems integration projects.

It is clear that where top management appoints a systems integration vendor to carry out a major development, the ability of the in-house information systems department to contribute to the management of the project is weakened. Unless the end user has the skills and can spare the resources to manage the project, this leaves the vendor effectively unmanaged by the client. This danger is particularly prevalent if the proposed system is companywide, so that no single end-user department can effectively take responsibility.

However, the detailed development work is not usually a cause for concern with systems integration projects. The main problem is typically the specification of the system.

A vague outline specification leads to problems because it gives too imprecise a definition of the work to be carried out, which typically leads to cost increases and delays in development.

Ideally, a specification needs to be fairly precise yet allow some degree of flexibility for change, and to be robust in the medium term. Companies' planning horizons and product life cycles are reducing continually. Any specification for a system being developed over a period of years needs to be robust enough to adapt to changing products, business approaches, and organisational structures. Many large projects, such as the EFTPOS scheme, have been abandoned because they have been rendered obsolete by changing external circumstances.

While it is essential that the end users are adequately involved in the initial specification and its subsequent evolution, it is also important that top management review the features proposed. This is to ensure that all the items proposed are cost effective, and features are not incorporated without commercial justification. Failure to do this will lead to both system inflexibility and a considerable increase in costs.

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Exhibit 3

Western European Systems Integration
Why Projects Succeed—User Perceptions

- Strong management by user
- Accountability retained by users
- Detailed agreement
- Regular monitoring

If systems integration projects are not properly managed by the client, there is always a danger that vendors will overelaborate on systems design and impose their own beliefs on the way the client's business should be run. To avoid these pitfalls, it is essential that systems integration projects are strongly managed by the client, as suggested in Exhibit 3.

Detailed agreements between the vendor and the client are increasingly seen as the key to successful management of projects, the development of the system being monitored against strict timescales, costs, and functionality. However, clients cannot afford to be too rigid in defining the initial specification. Projects have been known to fail even though they met the above criteria because the initial specification given to the vendor was flawed. Accordingly, it is important throughout the project to monitor the user's business objectives and to show a degree of flexibility in meeting them.

It is also essential that the client be professional in its approach to the project and provide the necessary co-operation to the vendor. This is best achieved by making individual client personnel accountable for the project in terms of its cost, delivery timeframe, and relevance to the organisation's needs. Client personnel should then manage the vendor to achieve these aims. This requires the agreement of detailed project plans and the frequent review of progress and quality of work.

Ideally, users need to combine the skills of top managers and IS departments in managing systems integration projects and in developing a close relationship with the systems integration vendor. The responsibility for project management of the vendor frequently falls in the gap between top management and the in-house information systems department. Top management may be impressed by the systems integration vendor's ability to understand their business problems and suggest the development of appropriate information systems for the business. However, top management does not necessarily have the skills to evaluate the vendor's development capabilities, or establish the infrastructure to manage the vendor effectively at a detailed level.

Conversely, the information systems personnel are likely to be experienced in evaluating and monitoring vendors at a detailed level, but may find that they are bypassed by the systems integration vendor that prefers to report to top management directly.

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Route to:

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A Publication from INPUT's Systems Management Programme—Europe

Transition Management—The Key to Systems Operations for Equipment Vendors

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Exhibit 1

Western European Systems Operations Market Segmentation

- Operations management
- Transition management
- Complete systems operations

The systems operations market in Western Europe can be segmented into the three main sectors shown in Exhibit 1.

The operations management segment consists of situations where the user's computer operations activities are outsourced. Most operations management contracts involve the operation of mainframe-based systems, though some instances of outsourcing of minicomputer-based systems do exist. Contracts are typically negotiated for five years at a time. The information systems department remains a major buying influence for system operations, and retains control of application maintenance and development.

Transition management involves the management of the user's existing systems while new systems are developed. Both the operation and maintenance of the existing systems are typically subcontracted. Contracts tend to be shorter than those for operations management and are typically around two years in length. As in the case of operations management, the equipment tends to be transferred to the vendor's premises.

Complete systems operations involves both the operation and maintenance of the user's existing information systems together with the redevelopment of any new systems required. In these cases, the user's information systems department no longer undertakes the specification and development of information systems within its organisation.

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Each of these segments has its own reasons for adoption and its own vendor selection criteria, which dictate the way in which each segment should be approached by vendors. The principal reasons users adopt systems operations are listed in Exhibit 2.

For operations management, the focus is overwhelmingly on cost management. Computer operations are increasingly being seen by users as a noncore activity, and operations management offers the user the combination of reduced costs with the guarantee of a fixed annual budget.

It is extremely difficult for users to control the costs of operating large machines such as mainframes, since many factors are outside the scope of users' control. These factors include:

- Vendor operating system modifications and upgrades
- Equipment upgrades required to maintain adequate service levels
- Changes in equipment vendors' marketing and pricing policies
- Equipment obsolescence
- Equipment downtime

In addition to the direct costs of the above, all can also lead to increased levels of staff overtime.

Indeed, many of the costs associated with these factors may be changed at comparatively short notice to suit the marketing policies of the equipment vendors. So it can be attractive to users to be able to delegate all these problems to a systems operations vendor.

The complexity of mainframes is another very important factor in the adoption of operations management. Effective management of a mainframe requires access to operating system expertise, performance monitoring and machine tuning expertise, and probably communications expertise. This not only makes day-to-day management a complicated task, but also can be very expensive. This situation is further exacerbated from the users' viewpoint by the rapid evolution of the technology.

However, if computer operations are outsourced, then the user benefits from fixed, and often reduced, costs and is freed from all the day-to-day problems associated with computer operations. Information systems management can now turn its attention to information systems strategies and maintaining systems in line with business requirements.

The prime motivation for users' adoption of transition management is the realignment of informations systems with the businesses they support. Transition management projects are comparatively short and have the purpose of freeing staff and space to concentrate on the new development activities.

Although cost may remain an important factor in the choice of vendor, it is not one of the principal driving forces for the use of systems operations for transition management.

Transition management frequently involves a downsizing of computer systems and a move to more decentralised information systems providing more focused support to individual business units.

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Exhibit 2

Western European Systems Operations
Principal Reasons for Adoption by Market Segment

Factor	Segment		
	Operations Management	Transition Management	Complete Systems Operations
Technological complexity	X		
IS cost control	X		X
Relating IS to business needs		X	X
Making IS more manageable		X	X
Freeing key personnel from maintenance activities		X	

Organisations adopting complete systems operations combine the need to realign information systems with business needs and the strong need to reduce costs. This combination is typically found only in organisations that are having to rethink their entire business strategies as a result of severe external pressures while, at the same time, facing significant internal pressure to reduce costs.

In the case of transition management, the organisation may be refocusing, but information systems management has usually retained sufficient credibility to continue to influence the direction of information systems. This influence may take the form of the information systems department retaining its development staff and developing the new systems required. Alternatively, in extreme cases, IS may simply assist in the development of the information systems strategy and the procurement of new systems.

However, complete systems operations seems to be adopted only where there is a severe crisis within the organisation, and the information systems department has lost all credibility over its ability to deliver the most appropriate information systems for the organisation.

Such a crisis may arise as a result of a loss of confidence by senior company management in the face of external pressure or a worsening competitive position. Complete systems operations will often arise as a result of a malaise more serious than problems within the information systems department.

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The principal vendor selection criteria adopted by users for each of these segments are outlined in Exhibit 3.

Cost is a particularly important criterion in the operations management segment, and since operations management is typically a long-term undertaking, vendor stability is also important. Vendor stability is measured by a combination of vendor size, user familiarity with the vendor, and the extent of the vendor's presence in the systems operations market. The latter criterion is one of the reasons the operations management segment is the market segment that is least receptive to new entrants.

While the motivations of users adopting systems operations in the operations management and transition management segments are quite different, their principal vendor selection criteria show a great deal of similarity. The main differences among vendor selection criteria for transition management and operations management are:

- Market presence is a less important vendor attribute for transition management due to the comparatively short-term, one-off nature of the arrangement.

- Cost is also a less important consideration in transition management.

The physical location of the equipment was perceived to be important by transition management clients, which reflects the need to clear space for new systems. There may also be the psychological need to remove from the premises the day-to-day problems associated with the "old systems".

Although cost is a primary motivation in the decision to adopt complete systems operations, it does not appear in the list of principal vendor selection criteria. In the case of complete systems operations, user concerns with cost and equipment operating skills are replaced by the need for the vendor to understand the client's business and translate this understanding into effective information systems.

For complete systems operations, independence from equipment vendors was perceived as important by users. This is because users fear being locked into a particular supplier and a lack of vendor impartiality and objectivity in developing future information systems strategies.

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Exhibit 3

Western European Systems Operations
Vendor Selection Criteria by Segment

Factor	Segment		
	Operations Management	Transition Management	Complete Systems Operations
Cost	XX	X	
Technological capability	X	X	
Vendor's market presence	X		
Location		X	
Business consulting skills			X
Development capability			X
Independence from equipment vendors			X

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Exhibit 4

Western European Systems Operations Positioning of Vendors

Market Segment / Vendor Type	Professional Services Vendors	Management Consultancies	Major Equipment Vendors
Operations management	Very good	Medium	Medium
Transition management	Very good	Medium	Good
Complete systems operations	Good	Very good	Medium

The current positioning of the various categories of vendor on the basis of these criteria are shown in Exhibit 4.

The professional services vendors already operating in the systems operations market are well positioned in both the operations management and transition management segments.

The management consultancies are poorly positioned in these segments due to their perceived high cost and the threat they pose—via selling of complementary services—to the user information systems department. However, the management consultancies are well positioned in the complete systems operations segment as a result of their perceived superior business consulting skills.

The major equipment vendors are not well positioned to target complete systems operations because of user fears of being locked in, and because of the need for vendor independence in specifying information system strategies. However, they are well positioned to target the transition management market where they have the necessary skills and where users are less concerned with existing market presence. Once the major equipment vendors have established themselves in the transition management segment, their market presence there will remove the major hurdle to their targeting the operations management market.

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User Skill Deficiencies Remain Most Important Driving Force for Systems Integration

While there is much comment on the changing role of user information systems departments and their increasing propensity to outsource, vendors still believe that 'lack of in-house technical capability' is the single most important factor leading to the outsourcing of systems integration projects in Western Europe.

Vendors still do not perceive a major change taking place in the role of information systems departments leading to the adoption of a more strategic perspective and increased acceptance of outsourcing. Skill and resource shortfalls remain the major reasons for outsourcing, not a fundamental shift in attitude towards co-ordinating third parties to achieve company goals. However, vendors do recognise that information systems managers now fall into two categories: those primarily concerned with technology and its implementation, and those who adopt a broader, business-oriented perspective. Systems integration vendors remain concerned that managers in the first category see themselves as in competition with vendors and are very reluctant to accept outsourcing. Those in the second category are viewed as more amenable to the use of external vendors.

Exhibit 1 lists the key driving forces as perceived by Western European systems integration vendors.

Exhibit 1

Key Driving Forces
Systems Integration, Western Europe

Factor	Level of Importance
Lack of in-house technical capability	Very high
Lack of in-house IS resources	High
Migration to open systems	Medium-High
Need to link heterogeneous equipment	Medium-High

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Of course, there must be a strong commercial justification for any large information systems project, whether it is implemented in house or by an external vendor; the major driving force behind the initiation of any systems integration project is the client's commercial environment. However, it is the combination of these commercial pressures and the technology now available that is giving rise to the types of projects that are now prevalent, many of which have a high networking content.

Communications has long been an area where in-house information systems departments have been comparatively short of expertise, and vendors are finding that users often lack the technical skills necessary to link heterogeneous equipment from a range of vendors.

Accordingly, many vendors—including Unisys, Bull and ICL—view their networking capability as one of their key strengths in systems integration. Indeed, some vendors specifically target companies with widely distributed operations as prime candidates for systems integration projects, as indicated in Exhibit 2.

Apart from the emphasis on cost reduction, a typical response of organisations facing severe commercial pressure is to try to improve their responsiveness to their clients. In many cases, this is leading to a restructuring of organisations with the emphasis on improved internal communication—often via flatter organisational structures and improved links to clients. This approach requires much improved access to information throughout the organisation.

This emphasis on information flow and accessibility within organisations leads to a requirement to establish a technological infrastructure that will support such plans. Some vendors report that there is currently less emphasis on applications within the systems integration market. The top priority for some users is to establish a platform that facilitates the flow of information around the organisation.

Because major projects rarely arise outside companies facing severe competitive pressures, other systems integration vendors focus almost exclusively on industries they perceive are undergoing radical change. One example is the Western European discrete manufacturing sector, which is more exposed to global competition than many other industry sectors.

Exhibit 2

Vendor Targeting
Systems Integration, Western Europe

- Major organisations
- Industries undergoing radical change
- Companies with widely distributed operations

Source: INPUT

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Groupe Bull Systems Integration Strategy

Groupe Bull has strong systems integration credentials in Europe and is expanding its U.S. participation. It is committed to providing successful solutions for systems integration clients even if the majority of the product is non-Bull. Other SI vendors may want to know more about Groupe Bull's strategy as it sets out to expand its systems integration business. As will be discussed later in this bulletin, Groupe Bull has a strategic focus on developing and maintaining quality partnerships with other SI vendors that offer opportunities in Europe and in the U.S.

Jacques Weber, Executive Vice President of Groupe Bull's Systems Integration Group, recently reviewed this renewed worldwide emphasis on systems integration with Peter Cunningham, President of INPUT. Both parties agreed that INPUT's Systems Integration Programme clients would be interested in hearing more.

Groupe Bull's renewed emphasis on systems integration is a result of recognition of its clients' needs for services and solutions. Its large customers have expressed a growing need for systems integration services as they see equipment architectures evolving in two related but distinctly different directions.

First, Groupe Bull's clients believe that open systems architecture is being reaffirmed as vendors cooperate to find a common operating environment strategy. Users are planning new systems applications that are transportable across platforms and that will reduce their corporate investment in software development and maintenance costs.

Second, corporations are implementing distributed architecture strategies to capitalize on the cost-effectiveness of minicomputers or microcomputers for departmental applications while still retaining the information depository capabilities of large mainframes.

Market Evolution

The pattern that Groupe Bull's clients believe is emerging is that no one vendor can provide the entire solution—hence the need for a systems integrator. Groupe Bull is positioning itself to participate in that market as it evolves. Exhibit 1 presents Jacques Weber's view of systems integration market drivers.

The need for integration services increases as the need for interoperability increases. The systems integrator must know how to combine different platforms with multiple operating systems to deliver a seamless solution to the user. Such a solution must

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Exhibit 1

Systems Integration Market Drivers

- Need for interoperability
- Complex customer environments
- Complex procurement decisions
- Sharing of project risks
- Focus on mission-critical systems

adapt to a customer environment that becomes more complex as businesses become more interdependent and operate around the world and around the clock.

The procurement process will become increasingly complex in this environment. Along with this complexity will be a higher degree of risk. The client's MIS staff needs to focus more and more on mission-critical systems, systems whose successful implementation will, at the least, improve firms' competitiveness. Often, these systems will even alter the way the company does business. In such an environment, clients are asking the systems integrator to share in the project risk.

Groupe Bull's Integration Strengths

Jacques Weber outlined the strengths that Groupe Bull brings to the systems integration marketplace. These strengths are summarized in Exhibit 2. Groupe Bull is an organization of more than 2,500 systems integration professionals. The technological skills they bring to bear on client problems include expertise in such "hot" new technologies as image processing and secure networks.

Groupe Bull recognizes the importance of focusing on vertical markets in order to develop a presence in systems integration and has already penetrated selective niches in specific market sectors in Europe. Groupe Bull plans to build on its expertise to expand penetration even further. Jacques Weber gave examples of Groupe Bull's experience. He pointed out that Groupe Bull has 25% of the police command-and-control systems in the U.K., Italy, Spain and France. It also has 30% of the market in the retail and distribution industry in the Netherlands. As Exhibit 3 illustrates, the company also has a dominant position with European taxation and customs authorities.

Overall the company's principal successes have been in the government and banking sectors. For example in the U.K., Groupe Bull's emphasis has been on UNIX-based government projects.

The market penetration illustrated in Exhibit 3 is particularly significant when one notes that the European Economic

Exhibit 2

Groupe Bull Integration Strengths

- 2,500 SI professionals
- New technology focus
  - Secure networks
  - Image processing
- Worldwide development network
- Base of European SI projects

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Exhibit 3

Groupe Bull's Market Penetration

Market Niche	Countries
Police command/control	U.K., France, Italy, Spain, U.S.
Taxation systems	U.K., Poland, France, Ireland, U.S.
Custom systems	U.K., Belgium, Denmark, Italy, France
Retail distribution	The Netherlands, U.S., Canada
Health & human services	U.S., Canada

Community is developing proposals to link the information systems of many of the major national government departments to their equivalents throughout the EEC. Groupe Bull is well positioned as an integrator of choice for this opportunity if it does indeed come to pass.

Groupe Bull is well positioned to be a worldwide systems integrator serving the needs of its global clients. The recent acquisition of Honeywell Federal Systems Inc. enhances that capability. The emphasis on systems integration is in line with the overall company strategy of expanding its role from that of an equipment vendor to that of a full-service provider in the information technology industry.

The systems integration orientation will strengthen Groupe Bull's image as a problem solver and business partner among clients and prospects. The move into systems integration is viewed as a positive move internally, because the systems integration market is a clearly defined, maturing market that has been profitable for the vendor community. Open systems are seen as critical for the development of systems integration opportunities by Groupe Bull.

Organizing for Systems Integration

Jacques Weber elaborated on the organizational structure that has been implemented to pursue the systems integration market. It is a matrix management concept designed to use Groupe Bull's technical strengths efficiently.

Systems Integration Business Units (SIUs), designated as profit centres, are being established in the U.K., Italy, France, Benelux, Germany, Scandinavia, and the U.S. They do not have engineering (systems development) resources assigned to them, but actually subcontract with the Groupe Bull Project Management/ Engineering Centres (PME) for the needed resources to accomplish the systems integration task. The PME Centres are located in the U.K., Italy, France, Germany, and the U.S. Italy has possibly the most highly developed systems integration unit within the company; the German operation is concentrating largely on new business opportunities. Once a

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systems integration opportunity is won, a contract director is named to assume full responsibility for the execution of the contract.

Exhibit 4 summarizes the role of the Systems Integration Group within the larger Groupe Bull organization as outlined by Jacques Weber in his discussions with INPUT.

Exhibit 4

Role of the Systems Integration Group

- Provide strategic direction to SIUs
- Develop operating policies
- Support affiliates
- Develop internal skills
- Coordinate and build teams
- Establish worldwide partnerships
- Manage large multinational contracts

The SI Group's staff will be responsible for providing strategic direction and developing operating policies for all the SIUs. The group must formulate policies, identify the tools needed to resolve the clients' problems, and solidify the management processes necessary to deliver systems solutions in a timely manner. Internal policies relating to risk management, progress reporting, quality assurance, and financial management are among those to be implemented at the group level.

The coordinating functions established by the SI Group will be dictated by the company's international scope and the individual profit centre structure of the SI organization. The group will provide overall support to the affiliates, will be responsible for skills development across the many individual units, and will build the worldwide partnerships that must be in place to supplement Groupe Bull's internal resources. Finally, whenever multinational contracts are required, the group will be responsible for executing and administering them.

Partnership Management

Jacques referred to the term *partnership* frequently while discussing the strategy Groupe Bull has adopted for the SI market. INPUT has used the term *alliance* to describe the relationship between a vendor and a supplier that supplements the vendor's capabilities to provide a full-service offering.

Groupe Bull has evolved a more permanent concept for developing partnerships. The company will focus on developing partnerships with a small number of key players with which it can establish long-term, durable partnerships over an extended time. The relationship will not be opportunistic—that is, designed for a specific situation—but rather will be designed to let the partners work together jointly in R&D projects as well as in joint marketing and sales activities.

Jacques Weber expects the relationships to vary considerably in geographic scope—ranging from partnerships for specific countries to partnerships that span entire continents and even become worldwide. The commitment of the partners will also vary across opportunities. For example, a vendor may be a subcontractor to Groupe

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Bull on one opportunity, and the same vendor may be the prime contractor on another opportunity, with Groupe Bull as a subcontractor. Both vendors are perfectly comfortable with either relationship if a truly durable partnership has been established. Exhibit 5 illustrates the types of firms with which Groupe Bull has established partnerships in national markets. For example, in France it is not uncommon for Groupe Bull to act as a subcontractor to CGS and Andersen Consulting.

Overall Groupe Bull sees the ability to build consortia as the key to success. In particular, the company recognizes that it is not viewed as expert in business consultancy and needs to develop partnerships to fill this gap in its perceived capabilities.

Exhibit 5

Typical Groupe Bull Partnerships

Country	Partner Firm
U.K.	Logica British Telecom SD-Scicon Nucleus Technology
France	Andersen Consulting CAP Gemini Sogeti SEMA
U.S.	Deloitte Touche Nordata

Typical SI Projects

Groupe Bull has extensive systems integration experience in Europe. Typical of its broad experience are the projects listed in Exhibit 6. They represent the range of technologies that Groupe Bull—as a full-service systems integrator—provides, and the range of clients and applications it is capable of addressing.

Exhibit 6

Typical Groupe Bull SI Projects

Ansaldo (Italy)	Complete plant automation	UNIX TCP/IP MRPII X.25 Multivendor equipment
Dept. Social Services (U.K.)	Largest operational European OSI network	DSA/OSI X.25 ICL GC0S6
Post Office (France)	Workstation network for Financial Services Department	UNIX LAN X.25

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Business Objectives

Groupe Bull has very clearly defined the broad business objectives for the Systems Integration Group. The target is to win one out of every four bids at the start, and then to improve that ratio to one out of every two as the SIUs' experience increases. Current (1990) revenue for Groupe Bull's systems integration activities, exclusive of the Honeywell Federal Systems Inc. revenue, is $150 million. This represents less than 2% of the overall Groupe Bull revenues. The company has targeted its systems integration business to grow between 30% and 40% annually, and projects its SI revenues to be $800 million to $900 million by 1995.

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Competition for Key Partners Leads to Long-Term Alliances and "Locking Out" of Competitors

Access to key partners, typically with strong industry skills and experience, is becoming a critical success factor in systems integration. As a result, vendors are concentrating on strengthening their relationships with a small number of perceived key players.

Vendors have frequently found it futile to set up alliances in advance of specific opportunities, so most alliances begin as one-off agreements to target an individual prospect and develop according to the level of success encountered and the future pattern of sales leads.

As a particular partnership becomes successful, vendors become increasingly reliant on one another and committed to the partnership. At this stage, agreements are commonly signed which form letters of intent for the vendors to work together on particular types of projects.

Ultimately, to protect access to key partners and possibly as a defensive measure to limit access to competitors, this can lead to equity participation. So far, equity participation has been used by vendors mainly to protect their access to applications software products, but it could feasibly be used by equipment vendors to protect their involvement with key professional services vendors and consultancies.

There is an appreciable risk involved in working with new partners, so vendors are strongly in favour of using partners with whom they have worked successfully in the past. In this case, vendors also profit from the past experience of working together. There are appreciable overheads in vetting a partner and developing a new working relationship.

The current pattern of need for alliances exhibited by equipment vendors, professional services vendors, and management consultancies is shown in Exhibit 1. Because of the scale and complexity of systems integration projects, all vendors need to develop alliances to fill the gaps in their product and service portfolios.

Equipment vendors typically use partnerships to give them access to applications software products and the software development resources required

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Exhibit 1

Need for Third Party Services
Western European Systems Integration

Services Required \ Vendor Category	Equipment Vendor	Professional Services Vendor	Management Consultancy
Applications Software Products	High	High	High
Equipment	Low	High	High
Business Consultancy	Medium-High	High	Low
Professional Services	Medium	Low	Low

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to implement and integrate them. Traditionally, the major equipment vendors have had little difficulty in getting access to suitable partners in these areas. Their immediate challenge is to develop alliances that will provide enhanced business consultancy capability.

The professional services vendors have strong in-house development and implementation capability, but often depend heavily on alliances for access to suitable applications software products. In many instances, their account management is weaker than that of the equipment vendors and they have a strong requirement to supplement their business consultancy expertise and resources. Of course, one alternative open to them is to become subcontractors to the major equipment vendors.

The use of business consultancy in initiating systems integration projects is becoming one of the critical success factors in the systems integration market, and is providing a major boost to consultancies. Andersen Consulting for example has seen its revenues increase dramatically in recent years. These vendors typically have their own professional services capability but depend on alliances for a wide range of applications software products.

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User Perspectives on Outsourcing Network Management

The major reasons users cite for requiring network management from an external contractor are

- Cost savings
- Non-availability of networking expertise
- Increasing complexity of the network supporting their business
- Individual project timescales

Outsourcing of network management is most likely when at least two of these factors impinge heavily on a user's decision making. On the whole, users expressed a preference for retaining management control of their networks in-house, although many expressed a potential interest in outsourcing

- "When the next generation of network is available"
- "When we need to increase our network management sophistication by a significant step"

Users perceive network management functions as having a three-stage life cycle, illustrated in Exhibit 1. This life cycle determines the segmentation of network management opportunities:

- Strategic feasibility studies relating network support to the overall business direction are needed every three to five years. External consultancy is often engaged as part of this exercise, and user satisfaction ratings for this type of service have been reasonably high.
- The second stage is network implementation. Network implementation exists at two levels.
  - At the strategic level. Decisions concerning the installation of new networks or the integration of one or more networks into a newer generation of network will require comprehensive design, commission and test programmes.
  - At the tactical level. Most networks undergo a continual process of upgrade, extension and reconfiguration during their lifetimes.

Exhibit 1

Segmentation by Function

- Strategy studies
- Network implementation
- Network operations management

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INPUT regards the strategic-level implementation projects as candidates for outsourcing contracts, and these are normally evaluated as part of the systems integration market.

- The third stage of network operations management starts when a newly commissioned network has been handed over for operational use in a state capable of sustaining the traffic envisaged (at least in its first phase). This stage in the life cycle is the prime candidate for being outsourced. These outsourcing contracts can be applicable to voice, data or integrated voice/data networks. They can have a variable geographic scope, i.e., can cover local-area networks (LANs), metropolitan-area networks (MANs) or wide-area networks (WANs). In the case of local-area networking, INPUT would expect an outsourcing contract to cover more than one network. For example, it could cover all LANs in a certain country or in a certain subsidiary or division of a larger group. At the level of individual LANs, outsourcing would likely be economically unsound.

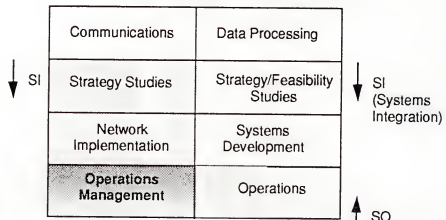
The very largest outsourcing contracts for network management cover the last two of the above stages, or all three. In other words

- A contractor is hired at the end of a strategic feasibility study to implement and run a network (or integrated set of networks) in accordance with the specifications or operational requirements deemed necessary from the study. An example of this is the case of the GDN (Government Data Network) contract that was awarded in the U.K. to the Racal-led consortium.
- Less frequently, the complete project—from strategic conception through daily operation—is contracted out.

Exhibit 2 summarises the relationships between network management and its adjacent markets in systems operations and systems integration. It shows the areas of high and low potential for outsourcing.

Exhibit 2

Network Management in Context



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Practical Network Management

What is it?

From the user's viewpoint network management encompasses a number of individual tasks requiring a considerable range of specialist skills. Networking skills are among the most scarce of all IS specialist skills. Exhibit 1 lists the major task areas for which a network manager may be responsible. It is not possible in this bulletin to do more than summarise them. INPUT's report *Network Management as a Systems Operations Outsourcing Opportunity, 1991-1996* discusses them in detail, both technological and commercial, and provides some insights gained from INPUT's recent research.

Some of the more interesting factors that impinge on the key network management functions are the following:

- Outsourcing contract possibilities may surface at the time of a strategy study. Skills required at this stage include knowledge of the latest business strategy techniques, particularly their implications for top-down systems development methodologies, and network modelling as part of business modelling.

- Detailed implementation and test of a network is distinguished from network commissioning in that it involves testing the network with whatever network management tools are to be used. This form of testing involves simulating different traffic volumes and proving the use of the computer-assisted procedures that have been installed.

- Operational management presents possibilities for part of a network to have its management outsourced, or for a major function within the overall management to be outsourced, while at the same time retaining the overall network administration in-house:

  - Remote NMC is when a user's network is connected to a vendor's network for purposes of day-to-day management control. It is particularly useful as a temporary measure when the user is migrating to a new network or when the user wishes to take advantage of new management tools but does not wish to employ the high calibre of staff needed to operate them.

  - Customer helpdesk applications are a discrete area of network management that can be outsourced to a specialist contractor with expertise in customer service management systems or in staff resourcing of this type of application.

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- Networks are usually viewed as inherently more robust and resilient than individual data centres. Many users do not see any need for the type of disaster recovery arrangements that they would need to make for their major processing centres. They often assume that rerouting, configuration, back-up units and good administration would be sufficient to cover the risks involved.

Nevertheless, as organisations grow more dependent on their networked systems, disaster recovery services (DRS) will extend as much to networks as to data centres. Vendors with outsourcing market ambitions in network management must be conversant in managing the sets of skills and resources required in this area.

Exhibit 1

Major Tasks to Be Achieved

- Strategy studies
- Specification and design
- Equipment selection and procurement
- Installation and commissioning
- Detailed implementation and test
- Training and education
- Operational management
  - Remote NMC
  - On-site
  - User/customer helpdesk
- Other links
- Consultancy
  - Ongoing
  - On tools
- DRS—acknowledged gap
- Documentation—a chronic weakness

Source: INPUT

Where are the Opportunities?

Network management is a complex and growing market area. As an increasingly mission-critical aspect of the corporate infrastructure, the network is being viewed by senior management as a real possibility for an outsourcing or FM (facilities management) contract. The situation, however, will vary greatly for users, depending upon:

- The state of development of IS within the particular organisation in question. Important factors here are the degree of sophistication that has been brought to the IS function and the leadtime before the next major upgrade to the network, the hardware infrastructure or the application systems.

- The degree to which the organisation has to rely on the network to support its activities, and the level to which these activities are given IT application support. Key factors here are the mix of activities within a large or conglomerate group, and the amount of telecommunications traffic, internal and external, that the organisation generates.

Vendors must not only be able to know the range of solutions being sold in the market place, but must also be prepared to offer a comprehensive and tailorable set to match the spectrum of opportunities available in this area to vendors from different backgrounds:

- PTOs, common carriers and telecommunications authorities have experience in running some of the world's largest networks for themselves and for the customers of their public service networks—whether PSTN, PDN, international service or other more specialised networks.

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- Other specialist carriers, such as mobile radio, radio paging or satellite broadcasting operations, have also had to master a range of network management skills.

- The independent network service providers understand applications and the running of text, data and even mixed networks.

- IS equipment and telecommunications equipment vendors, if they are large, will also have acquired considerable expertise in designing, installing and managing data and voice network systems.

- The major professional service companies have experience in implementing some of the largest IS systems contracts. Many of these involve systems integration contracts in which rationalisation, design, integration and even operation of networks are essential elements.

There is an equally varied set of outsourcing options for the user who might traditionally have only thought of managing the networks in-house through a Communications Manager and his team:

- Professional services systems operations contracts cover the use of operational or systems staff provided by the outsourcing contractor to provide, for example, end-user helpdesk facilities or a customer service management system.

- Processing services systems operations contracts cover situations where the user has access to dedicated equipment (which is vendor-owned) in order to implement his networking facilities. This equipment could be used to support a large portion (e.g., a private voice network) or the whole of the user's networking requirement.

- A managed network service (MNS) implements the same set of facilities as the processing services systems operations contract, but in a manner transparent to the user. It usually requires use of a shared data or voice/data network.

- The virtual private network (VPN) option is similar to MNS but implies that network management on a day-to-day basis has reverted to the user or that a degree of flexibility is inherent in the offering such that joint vendor-user management of the facility is feasible. VPNs require considerable supporting capacity in a vendor's network and are therefore still a rarity in Europe.

These major options are illustrated in Exhibit 2. The diagram can be interpreted to imply the ability of users to cycle through these different options—as time passes and as business requirements change. Hence, vendors must be on their toes to ensure customer loyalty at contract renewal time.

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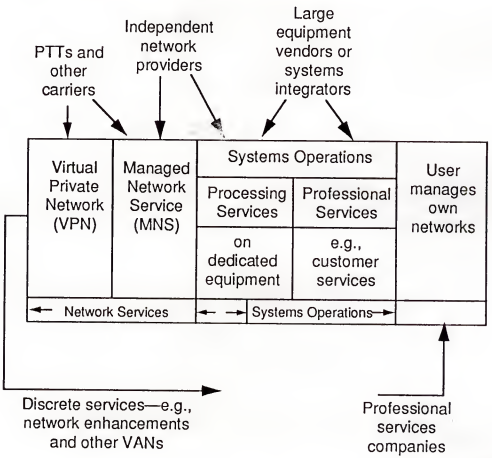
Exhibit 2

The Spectrum of Opportunities



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Network Management Services— A Market Leadership Opportunity

When considering the vendors of network management services, it is important to recognize that the market is young and there are no real leaders (and in some countries few identifiable players), at least in the minds of the telecommunications users.

As part of INPUT's 1991 research, users were asked to rate the ability of five categories of vendors to successfully provide network management services. None of the vendor categories were rated high; the ratings for the leading categories were heavily qualified.

Based on the user responses and a review of industry data on the product and service trends of major vendors, INPUT has developed a ranking of the likely leaders in providing network management services. The current and possible future rankings are discussed below.

User Ranking

INPUT's ranking is intended to reflect the ability of vendors to meet the broad requirements of design, implementation and ongoing management of increasingly complex networks that include voice and data circuits and local- , wide- and metropolitan-area networks.

The fact that most vendors are not regarded as market leaders is not a reflection on the fitness of those vendors' products to provide elements in the management process. Lack of market leadership is rather an acknowledgment that network management is not yet recognised as a market sector in its own right.

It is also important to remember that the industry is changing rapidly. Strategies being developed today will result in changes to the rankings in the not-too-distant future, and the emergence of leader companies.

The ranking of vendor categories, based on user responses, is shown in Exhibit 1. INPUT concludes that:

- The fact that the ratings resulted in PTOs and common carriers being ranked as the leader group was as much a matter of default as of positive recognition. The same can be said for the equipment vendors. Having no real basis for comparison, users tended to identify leaders based on the recognition of names.

- The medium ranking of independent vendors was influenced by two factors:

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Exhibit 1

User Ranking of Leading Vendor Categories

Vendor Category	Ranking Potential
PTOs/Common carriers	1
Computer equipment vendors	2=
Independent systems vendors	2=
Value-added network providers	2=
Network equipment vendors	5

Source: INPUT

- The survey contained a percentage of public sector organizations that, for competitive reasons, have a greater inclination to select independent vendors than do large national and international companies.

- In a number of cases, organizations that selected independent vendors did so to meet a specific need—for example, the management of a local-area network. Few large vendors are perceived as having the necessary inclination or experience to successfully manage local-area networks.

Potential Future Ranking

Because users do not perceive that there are any true current leaders, INPUT reviewed industry data about the products and services of the vendor categories in an attempt to identify which vendor category might be best positioned to emerge as a future leader in network management services.

INPUT's assessment of likely leaders is summarized in Exhibit 2. There are some notable differences from the ranking based on user assessments.

- Providers of network equipment—specifically vendors providing modems or large, intelligent multiplexers, such as Motorola Codex, NET and Timeplex; and providers of standalone network management equipment, such as Master Systems or Spider Systems—are expected to remain at the bottom of the list for a number of reasons.

  - Much of the equipment is orientated to either voice or data networks and, though the products are changing rapidly, there is no strong indication that these products will be able to meet the range of needs for managing a large, integrated network.

  - Considering the specific expertise needed to develop these types of products and the increasingly reduced margins, investments in the breadth of staff expertise necessary to manage areas beyond their product focus do not seem likely.

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- For this category of vendor, alliances with larger vendors that have a broader base of expertise (such as PTOs or computer equipment vendors) appear to be a more suitable approach than venturing on one's own.

- Having said that, certain vendors in this class were rated as highly service-orientated companies.

- Although independent systems vendors are not ranked highly, this ranking should be qualified.

  - The ranking reflects consideration of the total market opportunity, in which independent vendors are not expected to be major providers. Expertise is generally orientated to a particular technology (e.g., LANs) or to a particular market sector (e.g., manufacturing systems).

  - In a specific market sector or in a particular technology in which the vendor had particular expertise or was highly price competitive, independent vendors would rank much higher.

- Computer equipment vendors are becoming increasingly able to provide a wide range of expertise and are expected to be key participants in major contracts. However, there are several reasons that these equipment vendors are not the potential leaders.

  - Major equipment providers are traditionally orientated to their primary products and have not yet demonstrated significant expertise outside their traditional line(s) of business.

  - Though they have expanded their product lines to embrace the entire enterprise, there is not much evidence to suggest that they have the breadth of knowledge to take on the full range of responsibilities associated with managing large, integrated networks, particularly in terms of demonstrating a flexible service approach.

Exhibit 2

Ranking of Potential Leaders by Vendor Category

Vendor Category	Ranking Potential
Value-added network providers	1
PTOs/Common carriers	2
Computer equipment vendors	3
Independent systems vendors	4
Network equipment vendors	5

Source: INPUT

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- The design and engineering of large voice networks is one area in which the majority of computer equipment vendors lack expertise.

- However, equipment vendors can be expected to exploit opportunities where the primary focus is on systems operations as well as network operations management.

- Bearer service providers (the PTOs and other common carriers) are generally perceived to be in the best position to provide network management services. They have extensive knowledge in voice and data networks and much of their knowledge can be applied to local-area networking.

- Based on these considerations, bearer service providers and common carriers could be ranked as the leaders. However, there are several reasons why they have not risen to the top of the list.

  - Although substantive changes have been made to their images and offerings, many of these companies are still burdened with the management style of a regulated entity. This style frequently makes responding to rapidly changing markets difficult.

  - With the exception of very large national and international contracts, carriers may have limited opportunity for price negotiation.

  - Carriers such as AT&T have difficulty competing in local markets, and national carriers have difficulty competing at the international level.

  - Though major carriers have network management and local-area networking products, there is currently little to suggest that such carriers have the knowledge to take on the full range of responsibilities associated with managing local-area networks.

- INPUT believes that the major value-added network services (VANS) providers are in the best position to become market leaders over the next several years.

  - The nature of the VANS business frequently places them in closer touch with end users, which gives VANS providers a degree of end-user knowledge that other providers may not have.

  - VANS carriers have placed increased emphasis on the development of enterprise-wide network solutions. The solutions include intra- and inter-organisation networking. Included in the development of enterprise networks should be the interface to local-area networks.

  - Although VANS providers do not have extensive experience in voice systems, the nature of the VANS business necessitates an understanding of voice network engineering and management. In addition, consortia alignment of the major VANS with carriers provides VANS with a high degree of voice system expertise.

  - This type of alignment with carriers also gives the VANS providers access to high-capacity circuits. Because the VANS vendors are not under heavy regulation, they have greater pricing flexibility than do regulated entities.

  - Like the PTOs, VANS providers have sophisticated network management capabilities. Research indicates that they are continuing to enhance this capability with products for specific customers' sites.

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Conclusions and Recommendations

Many factors can influence the ability of any of the categories of vendors to become the market leaders.

- The VANS providers must move quickly to establish recognition that they have strong network management capabilities. As indicated by the research, these capabilities are not generally recognized today. For VANS providers, the key issue is whether they will be able to make the necessary investment to establish themselves in the market.
- For national common carriers, establishing a market position will be difficult, except in cases where an organization's activities are totally within a geographic area and the organisation's networking requirements are voice and data-oriented.
- For the major international carriers, the key issue will be the extent to which they can successfully leverage their acquisitions of major VANS suppliers.
- Unless the VANS providers and the national carriers can successfully meld their interests for mutual benefit, including ongoing support, their positions as potential leaders may be lost to the major equipment vendors.
- Equipment vendors can increase their leadership potential by establishing strong, committed relationships with organizations that are more heavily orientated to voice and local-area networks.
- The ranking of computer equipment vendors may be partially dependent on the extent to which network management contracts are tied to systems operations contracts. If the development of systems operations contracts results in major network management contracts, equipment vendors or systems integrators could emerge as the eventual leaders.

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Access to Key Decision Makers—Major Challenge for Systems Integration Vendors

The main challenge for systems integration vendors, given the comparatively small number of systems integration contracts awarded, is to gain access to the key decision makers, particularly top management in client companies. Business consultancy and IS strategic consulting are proving important tools in achieving this goal. This is reflected in the increasing trend of software and services vendors acquiring or forming joint ventures with consultancies.

Exhibit 1 provides examples of companies that are active in both consultancy and IS services, illustrating the growing convergence of these two areas. Andersen Consulting has achieved substantial growth in recent years by becoming the first management consultancy to focus on the development of IS strategies in support of business needs and to follow this up with a considerable systems development capability.

It is much easier for a management consultancy to gain user acceptance for its development capability than for a traditional software and services vendor to gain acceptance for its management consulting capability. To counter this problem, and to gain access to systems integration projects as soon as the need for change is identified, IBM has formed a joint venture with Coopers & Lybrand in the U.S. called Meritus. Meritus will target computer-integrated manufacturing projects, initially in the process manufacturing sector, for example, the pharmaceutical industry, and subsequently in the discrete manufacturing sector. Among the professional services vendors, CGS and CSC have been in the forefront of those acquiring consultancies. CGS, in particular, sees much greater emphasis being placed on its management consulting capability and has recently acquired United Research, Gamma SA, and the MAC Group. There is clearly a strong rationale behind these acquisitions. Users' IS strategies are no longer a simple matter of extending the application portfolio. Business change is now a primary driver and determinant of the information systems being implemented.

Exhibit 1

Vendors Offering Consultancy and IS Services

- Andersen Consulting
- Meritus
- CGS/United Research
- CSC/Index Group

Source: INPUT

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CSC, rather than acquiring business consultancies, is concentrating on purchasing consultancies such as Index and Butler Cox (acquired in May 1991 for $27 million), which advise users on IS strategies, technologies, and approaches. These acquisitions will also potentially provide early access to a wide range of development and systems integration projects.

There are also signs that many of the traditional management consultancies are considering extending their IS activities. For example, some of the consultancies with IS expertise that have until now tended to act only as management advisers (the consulting engineer role) in systems integration projects are now likely to move increasingly into the role of prime contractor. In addition, organisations such as McKinsey are extending their IS consulting activities.

Accordingly, there is a growing threat that access to systems integration projects initiated by many of the consultancies will become tied to particular software and services vendors.

Once a contract is won, one of the most significant challenges is to ensure the client's ownership and commitment to it. The client must have a clear understanding of requirements and the business rationale that lies behind them, and must be prepared to play a full part in the management of the project. Too many projects are technical successes but commercial failures because the initial specification did not match the business need, the client's business environment having changed while development was underway.

Another overriding consideration is the need to make a profit from systems integration. Some of the major influences on profitability are listed in Exhibit 2.

Exhibit 2

Influence on Profitability—Systems Integration, Western Europe

- Selective bidding
- Charging for pre-sales consultancy
- Risk management/sharing
- Managing expectations
- Change management

Source: INPUT

Firstly, it is important for vendors to be selective in bidding for systems integration projects. Bidding costs are high and vendors typically aim to win one in three proposals issued. In order to achieve this, vendors need to be well focused and use formal bid/no bid models to evaluate their chances of success for each proposal. A related problem for some of the equipment vendors in particular is charging for consultancy. Clients have become used to equipment vendors providing advice free of charge and making their margins on any resulting product sales.

At the proposal stage, it is important for vendors to have a strong risk management methodology that identifies possible scenarios and evaluates the profitability of each. The resulting model can be shown to the client, where appropriate, to persuade the client to adopt a lower-risk alternative or to participate in the financial risk of the project.

Once a project commences, it is important to liaise closely with the client and to manage client expectations. While client needs may evolve during the course of a project, it is important to vendor profitability that a rigorous change management procedure is enforced.

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Account Managers Are the Key Personnel for Developing Systems Integration Contracts

A survey of Western European systems integration vendors identified vendor account managers as the most important players in generating leads for systems integration projects. It is becoming increasingly recognised that to generate sales leads for systems integration projects, senior account managers with an excellent understanding of the client's industry and current business issues are essential. To give added business credibility, account managers must be strongly supported by centres of competence and industry experts.

However, systems integration projects are likely to arise from only a comparatively small number of major organisations and so, where these organisations are not already clients of the vendor, it is necessary to specifically target them with a new business sales force. This explains the ranking of the "new business sales force" in second place by vendors, as shown in Exhibit 1. In many instances vendors perceive "open systems" to be a very competitive approach in targeting competitors' major accounts.

Third parties are a significant source of business for a number of vendors, for example Digital, which can front systems integration projects on behalf of smaller partners.

In spite of the fact that business studies and IS strategy studies are important

Exhibit 1

Key Vendor Personnel in Lead Generation Systems Integration, Western Europe

Personnel	Level of Importance
Own account managers	High
New business sales force	Medium - High
Third parties	Medium
External consultants	Medium

Source: INPUT

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factors in the initiation of systems integration projects, external consultants are seen by vendors as currently making the least important contribution in generating business. However, a number of vendors—including IBM, CGS and CSC—have recognised the importance of this sales channel and are implementing strategies to secure increased business. Overall, many vendors are endeavouring to strengthen their links with the major management consultancies.

Exhibit 2 lists the key user personnel involved in purchasing systems integration projects in order of importance in the buying process as perceived by systems integration vendors.

Obviously management consultancies put more emphasis on their involvement with top management, while professional services vendors tend to achieve most success via IS management.

Many vendors regard systems integration as a "main board"-led market; one vendor commented that the key success factor in systems integration is "to get to as high a management level as possible, as quickly as possible".

Vendors should not, however, underestimate the role of the IS department in the buying process. In the larger organisations, the heads of information systems are taking an increasingly business-oriented perspective.

Exhibit 2

Key Players in Buying Process
Systems Integration, Western Europe

Player	Vendor Type		
	Equipment Vendor	Professional Services Vendors	Management Consultancies
Client board-level personnel	High	Medium	Very High
Head of information systems	High	Very High	Medium
Client middle management	Low	High	Medium

Source: INPUT

Overall, user top management and the head of IS are regarded as highly important, with user middle management making a less significant contribution to the buying process.

Business consultancy studies and IS strategy studies are key influences on the buying process for systems integration projects, as shown in Exhibit 3.

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Exhibit 3

Key Influences in Lead Generation Systems Integration, Western Europe

Influence	Level of Importance
Business consultancy studies or audits	High
IS Strategy studies or audits	High
Management workshops involving end-user management	Medium

Source: INPUT

For many of the equipment vendors, their best chance of success in the systems integration market lies in exploiting the major accounts within their existing customer base. Account management and control remains the key. The major tools used by the equipment vendors to assist in account development are management workshops. Typically, these workshops are aimed at involving senior user management, identifying their business strategies and critical success factors, and suggesting ways in which information systems can support these strategies. Industry and functional experts are extensively involved to lend credibility to the vendor's suggestions.

The management consultancies often generate systems integration projects as a direct result of business consultancy studies or audits. It is increasingly common for business consultancy studies to generate an immediate need for related information systems strategies, and subsequently information systems projects.

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Sharing Project Models Steers Users to Low-Risk Options

Vendors should use formal risk assessment models at the prospect qualification and proposal stages in all systems integration projects to assist them in managing both individual project profitability and bidding hit rates. In addition to assisting the vendor in bid/no bid decisions and pricing, these models can be instrumental in managing the client relationship.

Sharing the risk assessment model with the client can be particularly beneficial where the vendor needs to steer the client to a low-risk alternative or transfer some of the financial risk to the client. The risk assessment model should evaluate each of the client options using a range of scenarios that consider all possible commercial and technical risks. The financial implications, along with other considerations such as development lead times, can then be evaluated for each option/scenario. If vendors present this model to the client, the client will learn the risks inherent in each approach and can be steered towards a low-risk alternative.

The major overall sources of risk in undertaking systems integration projects are shown in Exhibit 1.

Exhibit 1

The Principal Risks
Western European Systems Integration

- Customer requirements unclear
- Pricing
- Partner's commitment and performance
- Resource exposure

Source: INPUT

The single most important cause of failure, reported by vendors, in systems integration projects is clients' lack of understanding of their own requirements. In the worst instances, this can mean that systems requested by the client are inappropriate for meeting business needs. In less extreme cases, this lack of

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understanding can mean that any specification supplied by the user may have significant omissions or no clear cut-off point.

To minimise occurrences of these problems, the vendor's prospect qualification process must ensure that there is a strong business justification for the project proposed. The vendor should involve his own business consultants to audit this objective. The project must provide real benefits to the client's business operation and must fully support current business strategies. The level of return on investment from the project should also be clearly identified.

Where vendors believe that projects are ill-founded, they are wise to suggest alternatives that will help the user organisation meet its real business goal, or to pull out of the project completely.

In addition to having a clear business justification, each systems integration project must be well-defined with a clear specification and acceptance criteria. Change control mechanisms should be established to monitor any deviations from the specification as the project progresses.

There is always a risk in systems integration projects of incorrectly estimating the cost of development and hence the price to be quoted to the prospect. It is estimated that this inaccuracy leads to project losses for vendors on up to 25% of systems integration projects. This is particularly true since most users expect systems integration development work to be conducted on a fixed-price basis. Indeed, some vendors are very aggressive in their adoption of fixed-price pricing strategies.

The means by which vendors minimise their pricing risks are listed in Exhibit 2. In general, the price must reflect the level of risk perceived by the vendor for each project. This was expressed by a vendor as:

"If the client can live with a degree of uncertainty (in the price), then more of his money goes towards systems functionality".

Exhibit 2

Risk Management—Pricing
Western European Systems Integration

- Ensuring pricing reflects risks
- Time-and-materials for fact finding
- Fixed-price for well-defined stages

Source: INPUT

The converse is also true. If a user insists on a fixed price for an imprecise specification, then the vendor—even if he accepts the challenge—is likely to build a considerable contingency premium into the price quoted.

In practice, many vendors encourage consultancy and fact-finding investigations to be conducted on a time-and-materials basis. However, there are signs that this is starting to change, and even consultancy studies are more often being performed on a fixed-price basis or against an upper limit of man hours. It is important to maintain an open exchange of ideas between client and vendor throughout the study, so that the client is not presented

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with any sudden shocks. Vendors also find it useful to hold some allocation of time in reserve to cater for any rework or small additional investigations that need to be done.

As opposed to adopting either a complete time-and-materials or complete fixed-price approach to systems integration projects, some vendors seek to protect themselves by taking a half-way approach when specifications are inadequate or incomplete. The programme is divided into separate phases to reduce the risk for both parties. The latter phases are not proposed or contracted until the initial specification phase is completed. The half-way approach typically means that a fixed price is only adopted for the next stage of the project and not for the project overall. In such cases, vendors will supply the client with overall project cost estimates that are for budgetary purposes only and are not contractually binding.

The partners used by the prime contractor for a systems integration project are another major source of risk.

The principal sources of concern with partners include:

- Their performance
- Their commitment to the project

Performance risks are typically minimised by vendors through a combination of strict procurement rules and familiarity with the partner.

In order to retain access to these key partners, vendors are increasingly negotiating long-term commercial agreements with them. Such agreements tend to be broad, rather than detailed, statements of intent that are not legally binding. However, for partners further down in the development process, more specific contracts can be signed committing the parties to mutually agreed upon charge rates and utilisation levels.

Some vendors have strict rules for the selection of new subcontractors. These rules typically place the emphasis on minimising risk of failure. Accordingly, vendors with innovative software products or technologies are unlikely to be favoured unless these products have already been well proven. In the case of systems integration projects, vendors have even less enthusiasm for pioneering than users do. Accordingly, only partners who can demonstrate a good track record are in demand.

In terms of risk sharing, subcontractors tend to receive a fixed-price contract from the prime contractor that mirrors the deal between the prime contractor and the client. There is little likelihood of a partner being paid if their performance is poor and they have to be replaced by the prime contractor during the course of the project. This can occur.

It is very important that the prime contractor works closely with its partners at the proposal stage and is open and honest in its approach to them. This is because the partner also has to make a commercial judgment as to whether to bid, and to identify its own probable return on investment.

Partners pulling out of proposals represents a significant problem for vendors. It is usually avoided by developing close working relationships between the prime contractor and partners and keeping them well informed of all developments. It is also advisable that the necessity for, and scale of, presale costs are clearly indicated to partners during the selection process, along with a realistic indication of the probability of winning the contract.

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Technical risk can also be an important consideration in systems integration projects due to their unique nature, and some of the factors that should be taken into account are listed in Exhibit 3.

Most vendors endeavour to avoid technical innovation within systems integration projects whenever possible, using only established equipment and software products. Similarly, vendors try to avoid performance guarantees such as system availability and response times. Although prototyping can be adopted as a last resort, response times can be difficult to predict with any certainty for one-off projects.

Where the client remains in favour of a high-risk approach, or insists on performance guarantees, the risk management model and the financial implications of the various alternatives can be explained to the client. The client can then be steered towards a low-risk solution, or persuaded to take responsibility for the financial risk for possible equipment upgrades, should performance requirements not be achieved.

Exhibit 3

Technical Risk Management
Western European Systems Integration

- Avoid equipment performance commitments
- Avoid technical innovation
- Transfer risk to client

Source: INPUT

Overall, it is important that the price quoted to the client reflects the risks involved, especially as most clients expect systems integration development work to be conducted on a fixed-price basis. At one extreme, if the client can live with a degree of price uncertainty, then more of the budget goes towards systems functionality. At the other extreme, comparatively risky fixed-price contracts should carry a considerable contingency premium.

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Industry-specific Business Experience—A Critical Success Factor in Systems Integration

The major initiative for a systems integration project typically comes from a member of the senior management team, who consequently tends to be the key decision maker in the choice of systems integration vendor. Although IS management may be involved in this decision, it is likely that they will be less influential in the choice of vendor, and will have little influence over the eventual outcome. Indeed, in some cases it is apparent that senior management uses external vendors, particularly consultancies, to fill the gap between themselves and their IS departments. This further weakens the influence of the IS department.

Systems integration projects often arise from:

- Reviews of business strategy
- Reviews of business operations
- IS strategy reviews and audits

These factors have a major impact on the criteria by which systems integration vendors are chosen. Typical selection criteria are listed in Exhibit 1.

Senior managers are not primarily concerned with, or often capable of evaluating, a vendor's technical capabilities. Their focus is on the vendor's

- Understanding of their business
- Experience in their industry
- Ability to suggest ways of improving the organisation's effectiveness and efficiency
- Ability to manage the change to improved business processes

Exhibit 1

Vendor Selection Criteria
Systems Integration, Western Europe

- Strategic advice capability
- Industry knowledge
- Ability to offer applications software product approach
- Experience/suitability of consultants

Source: INPUT

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Hence the scope of the dialogue is much wider than information systems. The information system may be viewed as a minor, but expensive, supporting tool. Accordingly, traditional software and services vendors are at a disadvantage unless they can provide sophisticated business consultancy, particularly in the initial business process review stages.

Once the information systems requirements have been clearly identified, any vendor who has an off-the-shelf solution to the problem will have a major advantage. Users are increasingly turning to packages, even for their mission-critical applications, recognising the speed of implementation, cost savings, and greater flexibility that can be achieved in this way. Though all systems integration projects involve elements of customisation, the vendor that can demonstrate a high proportion of standard software and a standard framework for integration will be well placed to succeed.

Finally, as consultancy becomes an increasingly common entry point into systems integration, the calibre and experience of the consultants and project managers proposed will become increasingly important determinants of success.

Exhibit 2

Vendor Selection Criteria
Professional Services, Western Europe

- Experience of vendor
- Detailed evaluation of capabilities
- Vendor located close to user

Source: INPUT

On the other hand, when information systems managers initiate projects, they are more likely to be professional services projects than systems integration projects. The vendor selection criteria reflect less concern with business issues and more concern with a detailed evaluation of each vendor's technical capabilities, as shown in Exhibit 2.

IS managers are likely to be the major decision makers in systems integration projects that involve extending the technical infrastructure of the company, for example, major network integration projects. In these instances, technical skill may be a more important selection criterion than industry-specific knowledge.

Vendor location can also be an important criterion. IS managers feel that it aids their management of vendors if the vendor has an office in a nearby city.

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Management Consultancies Typically Act As Consulting Engineers, not Prime Contractors

In-house IS departments are typically reluctant to use external vendors for business studies, specifications, and project management, preferring to retain control of these activities even where an element of subcontracting is necessary. Typically, the IS department is only prepared to use external vendors for these activities when it lacks the know-how or resources to perform them in-house.

However, it is clear that while IS departments are still reluctant to subcontract mission-critical applications in their entirety, they are increasingly prepared to use consultants as advisers and to subcontract elements of an implementation.

The major roles for which IS departments use consultancies are listed in Exhibit 1.

Exhibit 1

Major Roles of Consultancies

- Assistance with business specifications
- Assistance with vendor selection and monitoring
- IS strategy development

Where the IS department feels it lacks the business expertise to specify a major system, then it is common practice to employ a consultancy to provide the necessary know-how. One example is a German bank's approach to Andersen Consulting, McKinsey and Roland Berger. In this case, as in many others, the company was keen to keep control of project management, and system development in-house. The consultancy selected was only contracted to join the steering committee of senior executives and IS management and provide input to the project specification.

In other instances, consultancies are being used as consulting engineers to assist in:

- Systems specification
- Vendor selection
- Project management

However, it is important to note that consultancies carrying out these roles are typically only acting as advisers to IS management, which retains the ultimate responsibility for these activities.

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Much of the work carried out by consultancies such as Price Waterhouse and Andersen Consulting is in fact consulting engineering rather than acting as prime contractor.

IS departments are frequently more prepared to use consultants in this advisory role than to hand over complete responsibility for a project.

However IS departments also use consultancies such as Index and Nolan, Norton to assist them in redefining their overall IS strategies. This type of activity is a strong source of potential systems integration projects, and explains the popularity for acquiring such organisations within the systems integration vendor community. Recent examples of this include CSC's acquisition of Index and Butler Cox. Butler Cox was acquired in May 1991 for $27 million.

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Unisys' Complex Systems Organisation

Background

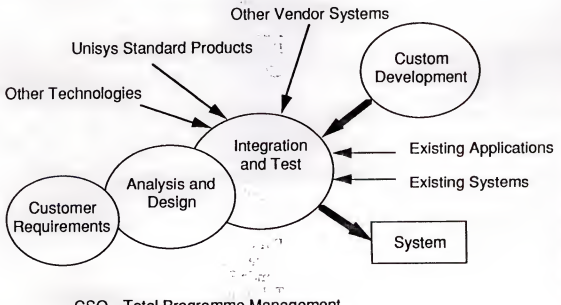
Unisys' Complex Systems Organisation (CSO) was established in 1988 in response to the growing needs of Unisys' major customers for total solutions. CSO's revenues in Western Europe are estimated to be $50 million.

The group is essentially a project-driven organisation, deployed in large accounts where it can address customers' complex solution requirements. It specialises in project management and systems integration, chiefly within a multivendor environment. Unisys' view of the systems integration process is shown in Exhibit 1.

The Complex Systems Organisation is positioned across Europe: in some countries it exists as a joint venture, in some as a separate legal entity and in others it forms part of the local Unisys subsidiary. The group has 220 people and

Exhibit 1

The Systems Integration Process



Source: CSO UK

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is supplemented by outside resources as required. In addition, the CSO network is able to call upon the Unisys European Skills Group, based at Uxbridge in the U.K., which is part of the Software & Services organisation, as well as the many Unisys specialist Skills Centres located around Europe. Similar organisations to CSO also exist in Australia and the United States.

The formation of the European CSOs has been a gradual and individual process. In some countries such as Portugal, the creation of a local CSO was fairly rapid, as the business had already been developed there.

Since the 1st of September 1990, CSO has been the responsibility of Kevin Devaney, Vice President of Software and Services.

"The importance of being able to provide a total solution to the customer is paramount to Unisys," he explains. "I believe the Complex Systems Organisation is a key ingredient as we accelerate the move from being a hardware and software vendor towards being a total solutions company."

"With the CSOs in place," Devaney comments, "Unisys feels confident that it can provide the complex integration services vital to the success of our customers during the 1990s. The CSOs are positioned as a pan-European network so that we now have the skills and the expertise to be the total solution provider in all major markets."

While CSO is Unisys' main vehicle for systems integration projects, Unisys' Professional Services organisation also implements some systems integration projects without involving CSO.

Driving Forces

Unisys believes that the systems integration market is characterised by the attributes listed in Exhibit 2.

Exhibit 2

Characteristics of SI Projects

- Driven by business pressures
- Desired solution is complex, multidisciplinary
- Extensive communications infrastructure required
- Programme management an essential element

Source: INPUT

Firstly, systems integration is driven by business pressures. For example, some organisations are driven to systems integration by financial pressures; other organisations face intense competition in their markets; and organisational issues can also be a driving force. The refocusing, reorganisation, and greater geographical coverage being introduced into European organisations in the run up to 1992 are major factors leading to systems integration projects.

Unisys also believes that users are no longer looking for vendors to build single application solutions. Customers' requirements are becoming more complex and frequently involve a considerable communications element. This is because interoperability is becoming one of the key driving forces. Users frequently have a range of applications running on heterogeneous equipment and need either to integrate these applications or at least provide more widespread access to them. While one solution to this problem would be to standardise on a single vendor's equipment, Unisys believes that a better approach is to implement an intelligent open systems network linking new systems and existing applications.

The benefits of this approach are:

- Protection of current investment in systems and information

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- Establishment of an open infrastructure onto which new applications can be added or "old" systems replaced
- Protection of future IS investment

In Unisys' experience, the existing applications already implemented within a company are likely to be based on a wide range of heterogeneous equipment covering a number of suppliers. The heterogeneity introduced by linking existing systems far outweighs that introduced by the introduction of new systems. However, another advantage of Unisys' approach is that it enables users to continue to use proprietary architectures, where appropriate, within an open framework, since many true open systems still lack the power and sophistication of proprietary systems. The user's move to open systems can take place more gradually and in a controlled manner.

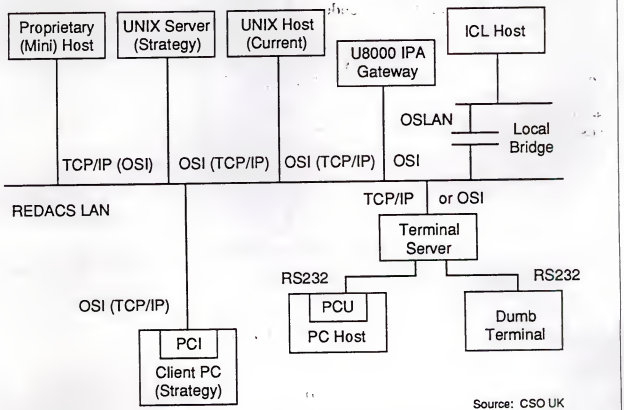
An example of such a project providing users with access to applications spread across a range of proprietary and UNIX systems is the REDACS (Regenerated Data Communications) project shown in Exhibit 3. This project required the supply, implementation and maintenance of a data communications network for the Royal Navy Supply and Transport Service. Initially this involved linking 40 sites and 2,000 devices, expanding to 5,500 devices by 1995.

Target Markets

Unisys believes that the initial role of CSO is primarily to target large companies in sectors where Unisys has an established client base rather than to target new market sectors. Accordingly, the principal target markets of CSO, shown in Exhibit 4, tend to reflect the profile of Unisys' overall large account user base.

Exhibit 3

REDACS LAN Connectivity



Source: CSO UK

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Exhibit 4

Unisys CSO Target Markets

- Major financial institutions
- Central government/defence
- Utilities
- Airlines/transportation/construction

Source: INPUT

However, each national CSO organisation has its own unique pattern of business. Some of the areas of expertise exhibited by CSO in a number of European markets are shown in Exhibit 5.

Exhibit 5

Unisys CSO Specific Country Specialisations

- U.K.
  - Police force systems
  - Regional electricity companies
  - Financial institutions
- Germany
  - Airlines
- France
  - Public sector
- Switzerland
  - Banking
- Spain
  - Airlines
  - Public sector
- Portugal
  - Fishing industry

Source: INPUT

Some examples of projects carried out in Western Europe are shown in Exhibit 6.

Unlike many major systems integration vendors, CSO is not currently endeavouring to establish either its own internal business consultancy or links with the major management consultancies, though this may change in the future. At present, CSO seems to be mainly concentrating on technical design and management rather than business skills—though CSO works closely with Unisys' "line of business" consultants where required. The rationale for this approach may be that Unisys is concentrating on accounts it knows well and so has little need for added intelligence of impending projects. CSO recognises the danger of becoming too closely linked to consultancies and risking losing the right to tender for the supply of projects.

Project Organisation

CSO has its own professional business development managers who work closely with Unisys' line of business sales force in the identification of systems integration projects. CSO regularly presents its capabilities to the sales forces to assist them in recognising systems integration opportunities. Once the salesman has opened the door, CSO takes responsibility for the sale. CSO relies predominantly on consultative selling—that is, establishing the credibility of its technical architects and programme managers. The organisations' credibility in accepting, containing, and managing risk is felt to be paramount.

The project organisation adopted by CSO for each major project is shown in Exhibit 7. CSO itself concentrates its resources on project design and

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management capabilities. Much of the development resource on any project will be subcontracted to Unisys' Professional Services Organisation or to third parties.

A typical project is split into two teams: one undertaking development and the other implementation. This ensures that only stable releases, rather than the latest development version, are implemented in the user environment. To ensure that the project stays on target, each project is independently reviewed by the project office (checking progress) and by financial control (checking expenditure).

Major Strengths

The key strengths of CSO are listed in Exhibit 8.

Like many of the equipment vendors, CSO sees its commitment to open systems as critical to its future development, and the organisation has undoubtedly built up considerable expertise in open systems network integration.

Two strengths which assist CSO in differentiating itself from the major professional services vendors are its wide European coverage and the organisation's access to equipment and systems software customisation skills normally associated with an equipment vendor. Although CSO might be seen by potential customers to lack independence in equipment choice, CSO will use other vendors' equipment where it believes it is better suited to the task in hand. To assist CSO in maintaining its independence, its revenues are not included in the target set for each national Unisys subsidiary. However, the "line of business" salesman is paid a bonus for assisting in the development of a systems integration sale.

Exhibit 6

Typical Projects

Crown Prosecution Service (U.K.)	Tracking case progress
Frankfurt International Airport (Germany)	Air traffic control
RTC Group (Switzerland)	Major networking projects
Royal Navy (U.K.)	Data communications network for supply and transport services
Post Office (France)	Distributed network with OSI capability
Ministry of Agriculture, Fishery & Food (Portugal)	Fishing control and protection
Banque Nationale de Paris (France)	Branch networking
Cerved (Italy)	Integrated network

Source: INPUT

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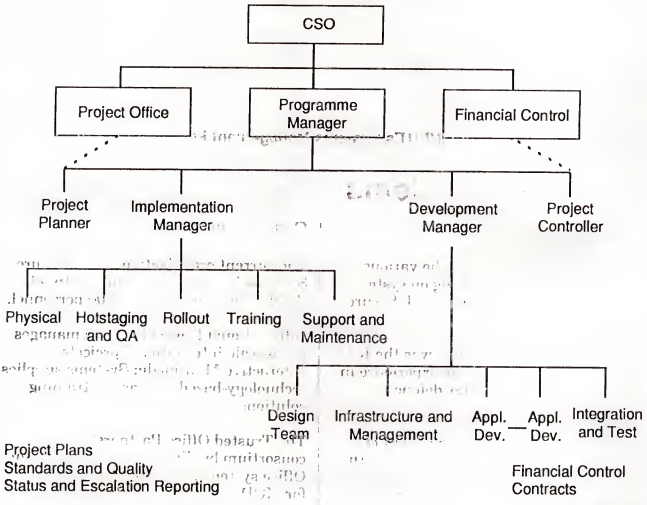
Exhibit 7

Project Organisation



Source: CSO UK

Exhibit 8

Unisys CSO Key Strengths

- Commitment to open systems
- European coverage
- Technical and R&D support
- Experience in OSI network integration
  - Overall network design
  - Component selection and implementation

Source: INPUT

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ICL Secure Systems

Background

In mid-1990, ICL combined the various parts of the company working on systems integration into one division: ICL Secure Systems.

The origin of Secure Systems was the ICL MOD business unit, with its experience in handling large and complex defence contracts.

ICL recognised that with the advent of open systems and a steady increase in the number of tenders calling for a total business solution to be installed and made operational in the client's organisation, the company had to be active in systems integration or risk being relegated to imply a "box" or software supplier.

For 1990, ICL claimed systems integration revenues of $240 million, and plans to increase these revenues at a rate of 30% per annum.

Organisation

The current organisation of ICL Secure Systems is shown in Exhibit 1. In total, the division employs over 800 personnel.

International Project Services manages large-scale international projects. Interactive Multimedia Systems supplies technology-based interactive training solutions.

The Trusted Office Partnership (TOP) is a consortium bidding for Secure Electronic Office systems. Its largest project, CHOTS for MOD HQ, is valued at hundreds of millions of pounds.

CPS also joined Secure Systems and provides software and applications development and implementation, consultancy, packaged services and authorship.

Network Systems provides a wide range of networking capability, particularly network consultancy and multivendor network integration skills.

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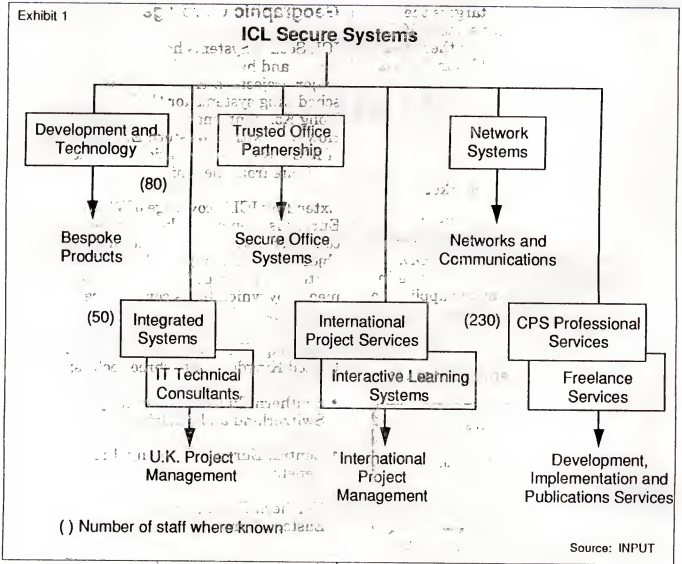
Exhibit 1



ICL recognises that the systems integration market is often best targeted through industry-specific account teams, and so sales of systems integration contracts are conducted not by dedicated sales staff within ICL Secure Systems, but through ICL account teams or third parties already working with the prospect. Where appropriate, ICL Secure Systems has access to the resources and skills of ICL's industry-specific business units.

Target Markets

Overall, ICL is organised into five industry-specific business units, covering the following sectors in the U.K.:

- National accounts (covering primarily the major utilities)
- Local government and healthcare
- Manufacturing and commercial
- Retail
- Financial services

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On a worldwide basis, ICL targets the retail and financial services sectors. ICL Secure Systems also addresses these two sectors worldwide and in addition focuses on:

- IT in telecommunications
- Airlines and ports
- The security/enforcement market

Its security/enforcement capability is a particular specialty of ICL stemming from the company's work for the U.K. MOD. This area is now thought to be growing in excess of 30% per annum and is applicable to the sectors shown in Exhibit 2.

Exhibit 2

Security/Enforcement Market

- Banks and stockbrokers
- Local government and healthcare
- Legal profession

Source: INPUT

Detecting financial fraud is obviously a critical application for this technology. The key is not in restricting access to particular transaction types by users but in having the capability to audit each user's pattern of work and identify any deviations from the norm.

Within local government and the health sector, data held on individuals is also highly sensitive as are briefing details within the legal profession.

The local government sector is a major niche market for ICL, and the company claims it is the third most successful vendor of information systems to the retail sector worldwide.

Geographic Coverage

ICL Secure Systems has a worldwide remit, and has carried out a number of major projects in Hong Kong, including scheduling systems for Cathay Pacific and Hong Kong International Terminals. However, within Western Europe, the bulk of ICL's system integration revenues still originate from the United Kingdom.

Extending ICL's coverage of Western Europe is seen as the key to meeting the company's systems integration growth objective, and a major collaboration in continental Europe is perceived as the means by which ICL's coverage can be rapidly extended.

ICL groups Western Europe (excluding the United Kingdom) into three sectors:

- Southern Europe (Spain, Italy, Switzerland and Austria)
- Central Europe (Germany, France, Benelux)
- Northern Europe (Scandinavia and Eastern Europe)

This year ICL is forming a European Network Integration Centre in Spain to address large projects in Southern Europe. The main emphasis is on networking (particularly X.25) projects in Spain and X.400 projects in Portugal.

ICL is also establishing its own systems integration capability to cover central Europe.

In Scandinavia, ICL owns RCI in Denmark and has aquired Databolim and Nokia Data. The opportunities ICL anticipates from its ownership of Nokia Data, which gives the company much improved coverage of Scandinavia, are shown in Exhibit 3.

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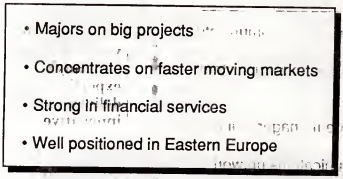
Exhibit 3

Nokia Data


• Majors on big projects
• Concentrates on faster moving markets
• Strong in financial services
• Well positioned in Eastern Europe

Source: INPUT

Nokia Data concentrates on large projects, often selling, installing, and networking thousands of personal computers and their applications within a single project. This means that the organisation is complementary to ICL, whose traditional expertise lies in networking mainframes and minicomputers, giving ICL greater access to the more rapidly growing terminal, personal computer, and UNIX-based markets. Nokia Data is particularly strong in financial services, and this range of capability is perceived to be especially applicable to the emerging markets of Eastern Europe.

ICL has also purchased five software and services vendors in Europe over the last year, including:

- Databolim (Sweden)
- Comdec (Netherlands)
- SIAC (Netherlands)

The role of these acquisitions is to extend ICL's expertise in vertical markets and to add systems integration capability.

"Risk" and "Reputation" Businesses

ICL characterises systems integration as the "risk" business, and views a lengthy relationship with potential clients as essential to success. A costed PERT analysis is required as a key element in the business approval process for systems integration projects, and this is used to ensure that the project team has sufficient understanding of the client and the requirements. The rule within ICL Secure Systems is that unless the company has been working with a potential client for a lengthy period, a bid should not be put forward.

ICL believes that price is seldom a differentiator on large projects; the main attribute sought by the potential client is certainty that the vendor can deliver. The acquisition of ICL by Fujitsu has served to reduce the perceived level of risk in using ICL as a systems integrator.

ICL has also moved into the "reputation" business with the formation of IT Partners. IT Partners employs 50 personnel, and although wholly owned by ICL, offers "arms-length" management consultancy, making use of ICL's expertise in fields such as:

- Quality management
- Human resource management
- Marketing

ICL finds considerable spin-offs from this operation in terms of advance warning of major projects.

Key Products and Partnerships

ICL is strongly committed to open systems, particularly open systems networking. In May 1991, ICL announced its OPENframework architecture and launched its Open Systems Management Centre. OPENframework is a blueprint for distributed computing, and the Open Systems Management Centre specialises in the control of open systems multivendor distributed networks. In the retail sector, for example, ICL has established an open

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Exhibit 4

Typical Projects

• U.K. MOD	- Secure office communications
• Deutsche Presse-Agentur (Germany)	- News transmission systems
• Racal (U.K.)	- Revenue management system
• Post Office (Spain)	- Communications network
• Cathay Pacific (Hong Kong)	- Airline scheduling system

Source: INPUT

systems platform and buys equipment such as bar code scanners from the most appropriate source.

Two of ICL's major strengths in systems integration are its networking capability and its expertise in system security.

ICL, like many other systems integrators, finds that collaborators on one project can be competitors on the next. In the U.K., ICL has worked closely in the past with other vendors, including:

- Coopers & Lybrand Deloitte
- Touche Ross
- Sema Group
- P-E
- PA
- CSC

For the Ministry of Defence CHOTS project, ICL is leading a consortium that includes: Hewlett-Packard, Data Logic, BISS, and Coopers & Lybrand Deloitte.

Some examples of projects carried out by ICL are listed in Exhibit 4.

These reflect ICL's capabilities in network integration as well as the company's expertise in delivering innovative business solutions. ICL believes in establishing partnerships with its customers on systems integration projects and working closely with them. This approach often leads to the development of products that can be more widely marketed by ICL and the client afterwards. For example, the airline scheduling system developed for Cathay Pacific will be offered to other airlines.

The major strengths of ICL Secure Systems are listed in Exhibit V-5.

Exhibit 5

Major Strengths

- Stability conferred by Fujitsu ownership
- Commitment to open systems
- System security expertise
- Network integration capabilities

Source: INPUT

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